BELYAYEV, V.I.; PAVLOVA, T.S.

Possibility of weather control through artificial dissipation of clouds. Izv. AN SSSR. Ser. geofiz. no.1:129-133 Ja '62. (MIRA 15:2)

1. AN SSSR, Institut prikladnoy geofiziki.
(Weather control)

32702
S/049/61/000/012/006/009
D207/D303

Propagation of crystallization ...

(Belyayev, V.I.); Tsentral'naya aerologicheskaya observatoriya (Central Aerological Observatory) (Gayvoronskiy, I.I. and Krasnovskaya, L.I.); Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova (Moscow State University imeni M.V. Lomonosov) (Kolesnikov, A.G.)

SUBMITTED: February 4, 1961

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Propagation of crystallization ...

A.G. Kolesnikov and V.I. Belyayev (Ref.4: Nauchn. dokl. vyssh. shkoly, fiz. mat. nauk, no. 4, 1958). The theory assumes that the process of propagation of a crystallization front in a supercooled cloud can be reduced to turbulent diffusion of ice nuclei produced by solid CO_2 and distillation of water from drops to crystals. For simplicity a cloud is assumed to be bounded by planes of infinite extent in horizontal directions. The cloud is also assumed to consist initially of droplets and particles all of the same size; appearance of particles of various sizes after seeding is allowed for. The theoretical and experimental curves showing $D(\tau)$ agreed satisfactorily, even quantitatively. The agreement indicated that crystallization fronts are very narrow and that their propagation is governed primarily by the turbulent diffusion coefficient K (dimensions $cm^2\ sec^{-2}$) and, to a lesser extent, by ε which is the density of ice nuclei (dimensions cm^{-2}) induced by CO_2. There are 4 figures and 4 Soviet-bloc references.

ASSOCIATION: Institut prikladnoy geofiziki, Akademiya nauk SSSR (Institute of Applied Geophysics, Academy of Sciences, USSR)

did not exceed -4°C. The clouds were seeded with solid CO_2 granules of 0.5 - 1 cm diameter. The atmospheric pressure, relative humidity and air temperature were measured during seeding with an aircraft meteorological instrument CM-43 (SM-43). Samples of the clouds were taken and examined microscopically. The amount of condensed water in the clouds was measured by Zaytsev's method [Abstractor's note: No details given] . The wind velocity was determined using a technique developed at the Gosudarstvennyy nauchno-issledovatel'skiy institut Grazhdanskogo Vozdushnogo Flota (State Scientific Research Institute of the Civil Air Fleet). After seeding, the aircraft flew above the clouds measuring the expansion of the cloudless zone produced by CO_2; this was continued until the cloudless zone filled again with clouds. Each experiment in air was preceded by soundings of the clouds from the ground. The results are presented in the form of the dependence (gradual increase) of the cloudless zone width, D, on time, t, which represents propagation of a crystallization front in a cloud. The experimental curves were compared with the theory developed in 1958 by

32702
S/049/61/000/012/006/009
D207/D303

3,5910

AUTHORS: Belyayev, V.I., Gayvoronskiy, I.I., Kolesnikov, A.G. and Krasnovskaya, L.I.

TITLE: Propagation of crystallization in supercooled clouds on introduction of solid carbon dioxide

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya geofizicheskaya, no. 12, 1961, 1844 - 1851

TEXT: The paper reports experimental work on dispersal of clouds by seeding with CO_2, carried out by I.I. Gayvoronskiy and L.I. Krasnovskaya; the experimental results are compared with theoretical relationships derived by the other two authors (A.G. Kolesnikov and V.I. Belyayev). Experiments were carried out during autumn and winter of 1956 - 7 at the Tsentral'naya aerologicheskaya observatoriya (Central Aerological observatory) using aircraft of the ЛИ-2 (LI-2) type. The aircraft flew in a straight line over clouds of St and Sc type which were not thicker than 500 m and whose temperatures at the top

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Calculation of the Shift of the Crystallization Front in an Undercooled Cloud Under the Action of CO_2

S/020/60/133/04/22/031
B019/B060

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

PRESENTED: February 15, 1960, by V. V. Shuleykin, Academician

SUBMITTED: December 14, 1959

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an unimportant part. For this case (1) is replaced by (5) which allows the determination of the vapor concentration, the droplet size, and the average size of the ice crystals. Numerical calculations of the vapor concentration in a cloud, which is important for determining the concentration front of a cloud subjected to the action of solid CO_2, revealed that the large drops and crystals play a decisive role for the vapor equilibrium, since the dependence of the vapor concentration on the radius can be neglected here. With the quick-operation computer "Strela" the authors made numerical calculations of the shift of the crystallization front as a function of the initial concentration of ice nuclei and of the turbulence coefficients, and, as a solution, the crystallization front was obtained as a function of time (Fig. 2). It is finally pointed out that no precise knowledge of the concentration of ice nuclei is so far available; the same holds for turbulence coefficients. By comparing the results obtained here with results obtained from the observation of the action of solid CO_2 on undercooled clouds, it is possible to make an estimation of the abovementioned, little known quantities. There are 2 figures, 1 table, and 2 Soviet references.

S/020/60/133/04/22/031
B019/B060

AUTHORS: Kolesnikov, A. G., Belyayev, V. I.

TITLE: Calculation of the Shift of the Crystallization Front in an Undercooled Cloud Under the Action of CO_2

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 4, pp. 835-837

TEXT: It is assumed in first approximation that the propagation of crystallization in an undercooled cloud takes place like a diffusion of ice nuclei due to the action of CO_2. Proceeding from this assumption, the authors had in a previous paper (Ref. 1) obtained the system (1) of differential equations for the calculation of this process. The authors discuss the density of the vapor sources (formulas (2) and (3)) and the radius of the droplets (formula (4)) and next, they adapt system (1) to results of observation. Crystallization in a cloud was found to take place in a narrow zone which divides the cloud into a crystallizing and a noncrystallizing part. An important part in this zone is played by sublimation, while the diffusion of vapor and of the droplets plays but

BELYAYEV, V.I.

Equations of crystallization of supercooled clouds with an account of coagulation. Izv.AN SSSR.Ser.geofiz. no.7: 1059-1068 Jl '60. (MIRA 13:7)

1. Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova.
(Cloud physics)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204600026-6

BELYAYEV, V.I.

Determining the critical size of crystallization nuclei. Izv. AN SSSR. Ser. geofiz. no.8:1279-1281 Ag '60. (MIRA 13:8)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Atomspheric nucleation)

S/169/62/000/011/022/077
D228/D307

AUTHORS: Kolesnikov, A.G. and Belyayev, V.I.

TITLE: Methods of estimating the crystallization of supercooled clouds under artificial influence

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 11, 1962, 30, abstract 11B190 (In collection: Issled. oblakov, osadkov i grozovogo elektrichestva, M., AN SSSR, 1961, 10-15)

TEXT: The results of work (RZhGeofiz, no. 1, 1960, 861) are reviewed, and it is shown that they can be extended to the case of a cloud which is polydispersed at the initial moment of time.
[Abstracter's note: Complete translation]

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BELYAYEV, V.I.

Size distribution of droplets in the cloud during its condensation stage of development. Izv. AN SSSR. Ser. geofiz. no.8:1209-1213 Ag '61. (MIRA 14:7)

1. Akademiya nauk SSSR Institut prikladnoy geofiziki.
(Cloud physics)

BELYAYEV, V.I.

Equations of a system of water droplets suspended in the air. Izv. AN SSSR. Ser. geofiz. no.9:1408-1417 S '61. (MIRA 14:9)

1. Akademiya nauk SSSR, Institut prikladnoy geofiziki.
(Cloud physics)

BELYAYEV, V.I.

Calculation of nonisothermal crystallization of clouds. Izv. AN SSSR. Ser. geofiz. no.10:1580-1584 O '61. (MIRA 14:9)

1. AN SSSR, Institut prikladnoy geofiziki.
(Cloud physics)

The Crystallization of Super-cooled Water Clouds by Freezing of Drops.

in the case R_1 = const, gives Eq.(29). To find the number of crystals with dimensions at time τ in the range $[r_2, r_2 + dr_2]$ Eq.(29) has to be integrated for all τ'' from 0 to τ, giving an expression for $\nu_2(r_2, \tau)$. With the help of the functions (20) to (23), the amount of water contained in the cloud drops and the amount of ice at a given time $[M_1(\tau)$ and $M_2(\tau)]$ can be easily formed. All numerical constants in the Eqs.(5), (15), (9), (11) and (18) are known except β, for which reliable experimental data is not available. There are no figures and 2 Soviet references.

ASSOCIATION: Moskovskiy gosudarstvennyy Universitet im. M. V. Lomonosova (Moscow State University im. M. V. Lomonosov)

SUBMITTED: January 31, 1957.

1. Raindrops--Temperature 2. Water vapor--Crystallization

The Crystallization of Super-cooled Water Clouds by Freezing of Drops.

in the range $[r_1, r_1 + dr_1]$. From Eq.(22) it is possible to find $R_1 = S_1(r_1, \tau)$ as follows from Eq.(5). Substituting in Eq.(25) gives $\psi_1\{\tau, S_1(r_1, \tau)\} = \psi_1(r_1, \tau)$. At time $\tau'' < \tau$, drops with initial dimensions in the range $[R_1, R_1 + dR_1]$ freeze. If the crystals which arise from these at time τ are to have dimensions in the range $[r_2, r_2 + dr_2]$, the conditions Eq.(26) and Eq.(27) on R_1 and dR_1 must be imposed (where S_2 is determined from Eq.(23)). The number of crystals (arising at a time $\tau'' < \tau$ in an interval $d\tau$) with dimensions at τ in the range $[r_2, r_2 + dr_2]$ is equal to Eq.(28) (where R_1 and dR_1 are defined by Eqs.26 and 27). The differential with respect to τ'' in this expression, after substituting Eq.(26) for R_1 ,

The Crystallization of Super-cooled Water Clouds by Freezing of Drops.

determined. Assuming these solutions are Eqs.(20),(21), (22) and (23), then, firstly, it is possible to determine the overall number of drops $n_1(\tau)$ and crystals $n_2(\tau)$ in the cloud at any time and, secondly, to determine the density of distribution by dimensions $\nu_1(\tau, r_1)$ and $\nu_2(\tau, r_2)$ at any time - these functions can be found from experiments comparatively easily. The functions $n_1(\tau)$ and $n_2(\tau)$ are obtained from the definition of the functions f_1 and f_2 .

$\nu_1(\tau, r_1)$ and $\nu_2(\tau, r_2)$ are obtained by considering a group of drops the initial dimensions of which lie in the range $[r_1, r_1 + dr_1]$ where dr_1 is given by Eq.(24). The number of drops in this group at the moment τ is $g(\tau, R_1)dR_1$; which, using Eq.(24) becomes:

$$g(\tau, R_1)\frac{dr_1}{\frac{\partial p(\tau, R_1)}{\partial R_1}}$$

Card 7/9 Eq.(25) gives the number of drops at time τ with dimensions

The Crystallization of Super-cooled Water Clouds by Freezing of Drops.

Eq.(17) for P_2 is obtained. Eq.(12) can be written in the form Eq.(18), using Eqs.(13) and (17). Thus five equations (Eqs. 5, 15, 9, 11 and 18) have been obtained for five unknowns r_1, r_2, n_1, n_2 and u, which can therefore be found and hence the crystallization process studied. The initial boundary conditions for the system are that: $u = u_1$, $f_2 = 0$ when $\tau = 0$; $\tau'' = 0$. Eliminating r_1, r_2, f_1 and f_2 from Eq.(18) by use of the other equations, an equation for u is obtained which can be written in the form Eq.(19) (where Φ is a function of $u(\tau)$ depending on the value of u in the range $[0, \tau]$), Eq.(19) can be solved by a numerical method which is discussed below. Taking a small value of $\tau = \tau_1$ u is calculated linearly in the region $[0, \tau_1]$ and $du/d\tau$ for the point τ_1 is calculated from Eq.(19). The process is then repeated until the final value of u is found. Once u has been found, the other unknowns can be easily

The Crystallization of Super-cooled Water Clouds by Freezing of Drops.

initial radii in the range R_1 to $R_1 + dR_1$ is equal to $f_2(\tau'', R_1)dR_1$. The number of crystals formed per unit time from this group is given by Eq.(11). Considering next the equation for the change in concentration of vapour $u(\tau)$ during crystallization, this change/unit time will be equal to the difference between the total vapour flow from the evaporating drops and total vapour flow to the growing crystals, Eq.(12). (P_1 is the vapour flow from the drops; P_2 is the vapour flow to the crystals). P_1 is first found (Eq.13) and then P_2. This latter can be obtained by integrating Eq.(3) with the boundary conditions (Eq.14), giving Eq.(15) which represents the radius of the crystal as a function of $r_2(\tau, \tau'', R_1)$. Eq.(16) gives the flow to a crystal arising at the moment τ''. At τ'' only those drops can freeze for which $R_1 > Z(\tau')$ $[\tau' = \tau'']$. Therefore Eq.(16) is integrated for R_1 between the limits $Z(\tau'')$ and R_1^{max}. On integrating again for τ'' between the limits 0 and τ,

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From Eq.(1) we have the number of drops in unit time, from this group, which turn into crystals (Eq.8). Using Eq.(6), it is found that $f_1(\tau R_1)$ can be expressed by an integral equation, which is most conveniently expressed in the form Eq.(9). At a certain moment τ' the considered group disappear as a result of evaporation. At this moment R_1 is given by Eq.(10) from Eq.(5). Eq.(10) permits the initial radius to be expressed in terms of the moment of disappearance of the drop $(R_1 = Z(\tau'))$. To distinguish one group of similar drops from another group, the initial radius of the drop is used. Crystals must be defined by two parameters: R_1 defining the drops from which they arise and τ'' the moment of freezing of the drop. The description of the crystallization process in terms of these two variables is analogous to the problems of hydrodynamics in Lagrangian variables. A function $f_2(\tau'', R_1)$ is introduced so that the number of crystals formed at time τ'' from drops with

The Crystallization of Super-cooled Water Clouds by Freezing of Drops.

u_2 are considered constant. Since at the initial moment, the drops are in equilibrium with the vapour, therefore $u(0) = u_1$. If the radius of the drops at this moment is R_1, then its radius at any later moment will be given by Eq.(2) with the boundary conditions Eq.(4). This gives Eq.(5). This indicates that drops can be divided up according to their initial radius - drops between R_1 and $R_1 + dR_1$ will remain similar all their lives and will disappear at the same time τ' . Thus the behaviour of each group can be calculated separately and the final result got by summing. Let the initial distribution be described by the function $\varphi(R_1)$. Then the number of drops at the initial moment in such a group is: $\varphi(R_1)dR_1$ (6)

Extend the function to $f_1(\tau, R_1)$ so that the number of drops in the range $(R_1, R_1 + dR_1)$ at any moment τ is equal to: $f_1(\tau, R_1)dR_1$. (7)

The Crystallization of Super-cooled Water Clouds by Freezing of Drops.

appearance seed crystal in unit volume of fluid is a function of temperature (Ref.2). Taking the process to be isothermal, the probability of freezing is proportional to the volume. Thus, if n' drops freeze/unit time from n drops (the same size) then: $n' = \beta v n$ (1)
where β = const, v is the volume of a drop. Since the initial dimensions of cloud droplets are small and crystals at this stage do not grow to a large size, the evaporation of drops and the growth of crystals can be considered to be controlled by molecular diffusion of water vapour. To describe this change Maxwell's equation is used for drops (Eq.2) and crystals (Eq.3). (Where r_1 is the radius of a drop; u_1 is the vapour concentration corresponding to equilibrium of vapour and drops; r_2 and u_2 are the same quantities for a crystal; D is the molecular diffusion coefficient for the vapour; ρ_1 and ρ_2 are the densities of water and ice; u is the vapour concentration in the absence of drops and crystals) u_1 and

BELYAYEV, V. I.

49-58-5-7/15

AUTHORS: Kolesnikov, A. G. and Belyayev, V. I.

TITLE: The Crystallization of Super-cooled Water Clouds by Freezing of Drops (O kristallizatsii pereokhlazhdennogo vodnogo oblaka putem zamerzaniya kapel')

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Geofizicheskaya, 1958, Nr 5, pp 636-642 (USSR)

ABSTRACT: Ref.1 considers the process of crystallization of super-cooled water vapour when crystals arise on sublimation nuclei. This would occur in seeding experiments, but in natural processes it is more likely to occur by freezing of the water droplets. It is assumed that the cloud is homogeneous (i.e., the functions used do not depend on coordinate) so that calculations can be made per unit volume. At the start the cloud consists of water vapour and drops in dynamic equilibrium. It is assumed that at a certain time, due to a change in temperature, etc., metastability occurs. This moment is taken as the onset of crystallization. Since the saturation vapour pressure is lower over ice than water, the ice crystals grow at the expense of the water vapour. This loss of water vapour causes the unfrozen drops to evaporate and the process continues till the whole cloud has frozen. The freezing process occurs almost instantly that a seed crystal appears. The probability of

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On the Calculation of the Rate of Crystalline Growth SOV/155-58-5-19/37
of a Supercooled Cloud Under Influence of Ice-Forming Particles

r_3 magnitude of the particle. In section 3 the author tries to extend the obtained results to the two-dimensional case occurring in natural situations.
There are 13 references, 8 of which are Soviet, 2 English, 2 Japanese, and 1 American.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova (Moscow State University imeni M.V. Lomonosov)

SUBMITTED: May 8, 1958

Card 3/3

On the Calculation of the Rate of Crystalline Growth of a Supercooled Cloud Under Influence of Ice-Forming Particles SOV/155-58-5-19/37

$$n_2 = \frac{\varphi_2(x_2, \tau_2)}{2\sqrt{\pi K(\tau - \tau_2)}} e^{-\frac{(x-x_2)^2}{4K(\tau-\tau_2)}}$$

$$\varphi_2(x_2, \tau_2) = \int_0^{r_3 \max} W\left\{u(x_2, \tau_2),\ r_3\right\} \nu(r_3, x_2, \tau_2) dr_3$$

Here u denotes the steam concentration, $\bar{r}_2$ medium size of the crystals in the point x in the moment τ, K the coefficient of turbulent diffusion, D the coefficient of molecular steam diffusion, x_2 the initial coordinate of the crystal originated in the moment τ_2, W the probability of the formation of ice crystals on the particles, ν the density distribution function,

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3(7)

AUTHORS: Kolesnikov, A.G., Belyayev, V.I. SOV/155-58-5-19/37

TITLE: On the Calculation of the Rate of Crystalline Growth of a Supercooled Cloud Under Influence of Ice-Forming Particles

PERIODICAL: Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye nauki, 1958, Nr 5, pp 102-107 (USSR)

ABSTRACT: The paper consists of an introduction (section 1) in which the author refers especially to the papers of V.Ya.Nikandrov, G.M. Bashkirova, P.N. Krasikov and others, and of 2 further sections. In section 2 he considers the onedimensional problem analogously to [Ref 11] : In the starting moment the ice-forming particles are in a vertical plane and then diffuse in horizontal direction, whereby simultaneously crystals are formed on them. For the steam influx to the crystals the author obtains

$$q_2 = 4\pi D(u-u_2) \int_0^{\tau} d\tau_2 \int_{-\infty}^{\infty} n_2 \bar{r}_2 dx_2$$

by similar considerations as in [Ref 11], where

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On the Calculation of the Rate of Crystalline Growth of an Undercooled Cloud Under Influence of Hard Carbonic Acid Gas

SOV/155-58-4-32/34

scheme. A numerical example is given.
There are 2 figures, and 3 Soviet references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova (Moscow State University imeni M.V. Lomonosov)

SUBMITTED: April 5, 1958

Card 2/2

~~3(7)~~ 3,5000

AUTHORS: Kolesnikov, A.G. Belyayev, V.I. SOV/155-58-4-32/34

TITLE: On the Calculation of the Rate of Crystalline Growth of an Undercooled Cloud Under Influence of Hard Carbonic Acid Gas (K raschetu skorosti kristallizatsii pereokhlazhdennogo oblaka pri vozdeystvii na nego tverdoy uglekislotoy)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye nauki, 1958, Nr 4, pp 199 - 206 (USSR)

ABSTRACT: The authors propose to calculate the process of artificial crystallization of a cloud under an influence of CO_2 on the basis of the following simple scheme : The process is understood as a diffusion of ice particles arising under the influence of hard carbon dioxide, and as the distillation of water from the drops on the ice crystals. The calculation according to this scheme is carried out under the simplest assumptions (horizontal, thin, infinite cloud ; linear diffusion of CO_2 etc). It is proposed to verify experimentally the obtained formulas in order to obtain indications for those facts which are not taken into account in the

Card 1/2

3(7)

AUTHORS: Kolesnikov, A.G., and Belyayev, V.I. SOV/155-58-2-42/47

TITLE: On the Crystallization of a Supercooled Cloud on Interspersed Artificial Sublimation Centers (O kristallizatsii pereokhlazhdennogo oblaka na iskusstvennykh yadrakh sublimatsii, vvedennykh v nego putem zaseva)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye nauki, 1958, Nr 2, pp 200-203 (USSR)

ABSTRACT: The authors consider the isothermic crystallization of a cloud consisting of water vapor and water drops cooled to ca. -10°C, the microstructure of which is independent of the local coordinates, and in which to a given moment a large set of sublimation kernels is interspersed. The authors establish a system consisting of six equations out of which the number of appearing crystals, the vapor concentration, and other characteristics of the sublimation process can be obtained as functions of the time.
There is 1 figure, and 3 references, 2 of which are Soviet, and 1 American.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova (Moscow State University imeni M.V.Lomonosov)

SUBMITTED: January 15, 1958

Card 1/1

ILLEGIBLE

SOPKO, P.F.; BELYAYEV, V.I.; ZHILENKOV, G.V.

Some data on magmatic rocks of basic and ultrabasic composition in the southern part of Voronezh Province and their metallogenic significance. Dokl. AN SSSR 136 no.2:437-440 '61. (MIRA 14:1)

1. Voronezhskaya kompleksnaya geologorazvedochnaya ekspeditsiya i Voronezhskiy gosudarstvennyy universitet. Predstavleno akademikom D.S. Korzhinskim.
(Voronezh Province—Rocks, Igneous)

ROMAN, O. V.; BELYAYEV, V. I.; KUTSER, M. Ya.

"The use of byproduct steel powder from ball bearing production in powder metallurgy."

report submitted for Intl Conf on Powder Metallurgy, New York, 14-17 June 65.

Belorussian Polytechnical Inst, Minsk.

ILLEGIBLE

PHASE I BOOK EXPLOITATION SOV/6107

Belyayev, Vasiliy Ivanovich

Issledovaniye protsessa ustalosti metallov (Investigation of the Metal Fatigue Process). Minsk, Izd-vo MVSS i PO BSSR, 1962. 109 p. Errata slip inserted. 2700 copies printed.

Ed.: V. T. Nekhay; Tech. Ed.: A. P. Dubovik.

PURPOSE: The book may be useful to scientists, machine designers, and students.

COVERAGE: The book deals with metal fatigue and discusses the effect of various test conditions on the endurance limit and service life of carbon and alloy steels and nonferrous metals. The effect of limit load type, the strain rate, and the size factor (scale effect) is also analyzed. The assistance of Professor T. A. Lebedev is acknowledged. There are 55 references: 52 Soviet, 2 English, and 1 French.

Card 1/1

BELYAYEV, V.I., kand.tekhn.nauk

Effect of underloading and successive overloadings on the fatigue strength of steels. Mash.Bel. no.6:94-110 '59. (MIRa 13:6)
(Steel--Testing)

BELYAYEV, Valentin Ivanovich; MIROSHNICHENKO, V.D., red. izd-va; SHKLYAR, S.Ya., tekhn. red.; LOMILINA, L.N., tekhn. red.

[Practices in planning and analyzing coal production costs] Praktika planirovaniia i analiza sebestoimosti dobychi uglia. Moskva, Gos.nauchno-tekhn. izd-vo lit-ry po gornomu delu, 1961. 207 p. (MIRA 14:6)

(Coal mines and mining--Costs)

BELYAYEV, V.I., kand.tekhn.nauk.

Sinking screw piles. Avt.dor. 20 no.7:24-25 Jl '57. (MIRA 10:10)
(Piling (Civil engineering))

BELYAYEV, V.I.

Using aluminum in construction. Nov. tekh. i perod. op. v stroi. 20 no. 7:11-16 Jl '58. (MIRA 11:8)

1. Deystvitel'nyy chlen Akademii stroitel'stva i arkhitektury SSSR.
(Aluminum, Structural)

BELYAYEV, Valeriy Ivanovich; BELEN'KAYA, L.L., red.

[Lagrongian method in the kinetics of cloud processes] Metod Lagranzha v kinetike oblachnykh protsessov. Leningrad, Gidrometeoizdat, 1964. 117 p. (MIRA 17:7)

KORNIYENKO, A.M.; SHTEL'MAKHOV, M.S.; GEYLER, Z.Sh.; BERESNEV, V.A.; KOTLIK, S.B.; GORFINSKIY, Kh.M.; ZEL'DIN, Yu.R.; KURGIN, Yu.M.; BELYAYEV, V.G.; ZAK, P.S.; ZAYTSEV, A.A.; LI, A.M.; SKVORTSOV, L.N.; LUTTS, R.R.; KHVINGIYA, M.V.; NINOSHVILI, B.I.; SEMENCHENKO, D.I.; SUKHANOV, V.B.

Soviet inventions in mechanical engineering. Vest.mashinostr. 45 no.11:87-88 N '65. (MIRA 18:12)

BELYAYEV, V.G.

Case of neurodermatitis complicated by a mass attack of chicken mites. Med. paraz. i paraz. bol. 34 no.1:116-117 Ja-F '65.
(MIRA 18:8)

1. Primorskaya krayevaya protivochumnaya stantsiya, Ussuriysk.

BELYAYEV, V.G.

Ectoparasites of Magadan Province. Dokl. Prk. gos. nauch.-issl. protivochum. inst. no.5:180-185 '63 (MIRA 18:1)

BELYAYEV, V.G.; BORISENKO, G.A.

Profiling the ball-return channel for ball transmissions.
Stan. i instr. 35 no.6:13-16 Je '64 (MIRA 17:8)

BELYAYEV, V.G.; VEDERNIKOV, I.I.; GONCHAROV, V.N.; PATEYEV, A.Kh.; RUMYANTSEVA, M.B., red.; FORMALINA, Ye.A., tekhn. red.

[Using high-frequency current for defrosting frozen sprat briquets] Defrostatsiia briketov morozhenoi kil'ki tokom promyshlennoi chastoty. Moskva, Izd-vo zhurnala "Rybnoe khoziaistvo" VNIRO, 1962. 21 p. (MIRA 17:3)

1. Sotrudniki Kaspiyskogo nauchno-issledovatel'skogo instituta morskogo rybnogo khozyaystva i okeanografii, Astrakhan' (for Belyayev, Vedernikov).

BELYAYEV, V.G.; MALIKOV, B.F.

Economic evaluation of mining the metal-bearing filling materials in the Sadon Mine. Izv. vys. ucheb. zav.; tsvet. met. 3 no. 6:153-156 '60. (MIRA 14:1)

1. Severokavkazskiy gornometallurgicheskiy institut. Kafedra razrabotki mestorozhdeniy poleznykh iskopayemykh.
(Sadon region--Mining engineering--Costs)
(Ore dressing--Costs)

BELYAYEV, V.G., MALIKOV, B.F.

Ways of determining the efficiency of boring machinery with sinker hammers. Izv. vys. ucheb. zav.; tsvet. met. 2 no.2:6-10 '59. (MIRA 12:7)

1.Severokavkazskiy ogrnometallurgicheskiy institut, Kafedra razrabotki poleznykh iskopayemkh.
(Boring machinery)

BELYAYEV, V. G.

BELYAYEV, V. G. - "Analysis of a System of Caving-In in Layers and Methods of Perfecting It in the Process of Working Polymetallic and Copper-Pyrite Deposits." Min Higher Education USSR. Moscow Inst of Nonferrous Metals and Gold imeni M. I. Kalinin. Moscow, 1955. (Dissertation for the Degree of Candidate in Technical Sciences.)

So; Knizhnaya Letopis' No 3, 1956

BELYAYEV, V.F.

Synthesis of chalcones on the basis of β-chlorovinyl ketones.
Zhur. ob. khim. 34 no. 3:861-864 Mr '64. (MIRA 17:6)

1. Belorusskiy gosudarstvennyy universitet imeni V.I.Lenina.

BELYAYEV, V.F.

Ketovinylation of nitroparaffins. Zhur. VKHO 9 no. 3:358 '64.
(MIRA 17:9)

1. Belorusskiy gosudarstvennyy universitet imeni Lenina.

BELYAYEV, V.F.; YATSEVICH, N.M.; SOKOLOV, N.A.

Synthesis of chalcones on the base of β - chlorovinyl ketones. Part 2.
Zhur.ob.khim. 32 no.6:2022-2025 Je '62. (MIRA 15:6)

1. Belorusskiy gosudarstvennyy universitet im. V.I.Lenina.
(Chalcone)

KOCHETKOV, N.K.; BELYAYEV, V.F.; DUDINA, G.S.

Ketovinilation of nitrocyclohexane. Zhur.ob.khim. 32 no.6:1785-1789 Je '62. (MIRA 15:6)

1. Belorusskiy gosudarstvennyy universitet.
(Cyclohexane) (Vinylation)

BELYAYEV, V.F.

Autoxidation of 1-isopropyl-1-cyclohexene and 1-ethyl-1-cyclopenteme to hydroperoxides. Zhidkofaz.okis.nepr.org. soed. no.1:97-104 '61. (MIRA 15:2)

(Cyclohexene) (Cyclopentene)
(Hydroperoxides)

Autoxidation of 1-isopropyl-cyclohexene-1....

radical. Hence, the most reactive group in autoxidation is the methylene group near the alkyl radical. The latter increases the mobility of the hydrogen atom in the adjoining methylene group. Autoxidation experiments of 1-isopropyl--cyclohexene-1, at 68°C, during 6 h, carried out in the presence of the initiators cobalt stearate, acetate, formiate, manganese stearate and formiate, or kaolin showed that the cobalt compounds have the greatest activity, but also decompose the hydroperoxide which generates during autoxidation. In the presence of manganese and cobalt formiate the rate of autoxidation is smaller than without addition of initiator. A new hydroperoxide was synthesized by liquid-phase low-temperature autoxidation of 1-isopropylcyclohexene-1 and determined as 1-isopropylcyclohexene--1-hydroperoxide-6. Autoxidation of 1-ethyl-cyclopentene-1 was carried out at 60°C during 5 days without initiator and the following new hydroperoxide separated: 1-ethylcyclopentene-1-hydroperoxide-5. This compound is stable during long-lasting storage. There are 2 tables.

Card 2/2

S/580/61/000/000/009/016
A057/A126

1,3400

AUTHOR: Belyayev, V.F.

TITLE: Autoxidation of 1-isopropyl-cyclohexene-1 and 1-ethyl-cyclopentene-1 to hydroperoxides

SOURCE: Yerofeyev, B.V. and I.G. Tishchenko, eds. Zhidkofaznoye okisleniye nepredel'nykh organicheskikh soyedineniy, Minsk, 1961, 97 - 104

TEXT: The theme of the present work was suggested by B.F. Yerofeyev with the scope to determine the place of entrance of the oxygen atom into the molecule of the oxidized cyclene. Furthermore was to investigate the rate of autoxidation of cyclenes in presence and absence of initiators and two new hydroperoxides synthesized from 1-isopropyl-cyclohexene-1 and 1-ethyl-cyclopentene-1. The author observed in low-temperature liquid-phase autoxidation of 1-isopropyl-cyclopentene-1, 1-propylcyclopentene-1, 1-methylcyclopentene-1, 1-ethylcyclohexene-1, 1-propylcyclohexene-1, and 1-isopropylcyclohexene-1 that the introduction of oxygen occurs to the α-methylene group which is close to the alkyl radical. Thermal decomposition of the obtained hydroperoxides resulted in unsaturated ketones with the carbonyl group in the α-position to the double bond close to the alkyl

Card 1/2

KOCHETKOV, N.K.; BELYAYEV, V.F.

Synthesis of chalcones from β-chlorovinyl ketones. Zhur.ob. khim. 30 no.5:1495-1497 My '60. (MIRA 13:5)

1. Belorusskiy gosudarstvennyy universitet i Institut farmakologii i khimioterapii Akademii meditsinskikh nauk SSSR.
(Chalcone) (Ketones)

BELYAYEV, V.F.; BELOKURSKAYA, M.N.; KOCHETKOV, N.K.

Interaction between β-chlorovinyl ketones and β-dicarbonyl compounds. Part 12: Ketovinylation of ethyl α-benzoylpropionate and ethyl α-benzoylbutyrate. Zhur.ob.khim. 30 no.5: 1492-1495 My '60. (MIRA 13:5)

1. Belorusskiy gosudarstvennyy universitet i Institut farmakologii i khimioterapii Akademii meditsinskikh nauk SSSR.
(Propionic acid) (Butyric acid) (Ketones)
(Vinyl compounds)

KOCHETKOV, N.K.; BELYAYEV, V.F.

Ketovinylation of nitro compounds. Zhur. VKHO 5 no.6:706 '60.
(MIRA 13:12)

1. Institut khimii prirodnykh soyedineniy Akademii nauk SSSR.
(Nitro compounds)

BELYAYEV, V.F.

Obtaining the hydroperoxide of 1-methyl-1-cyclopentene by autooxidation. Uch.zap.BGU no.42:249-258 '58. (MIRA 12:1)
(Cyclopentene)

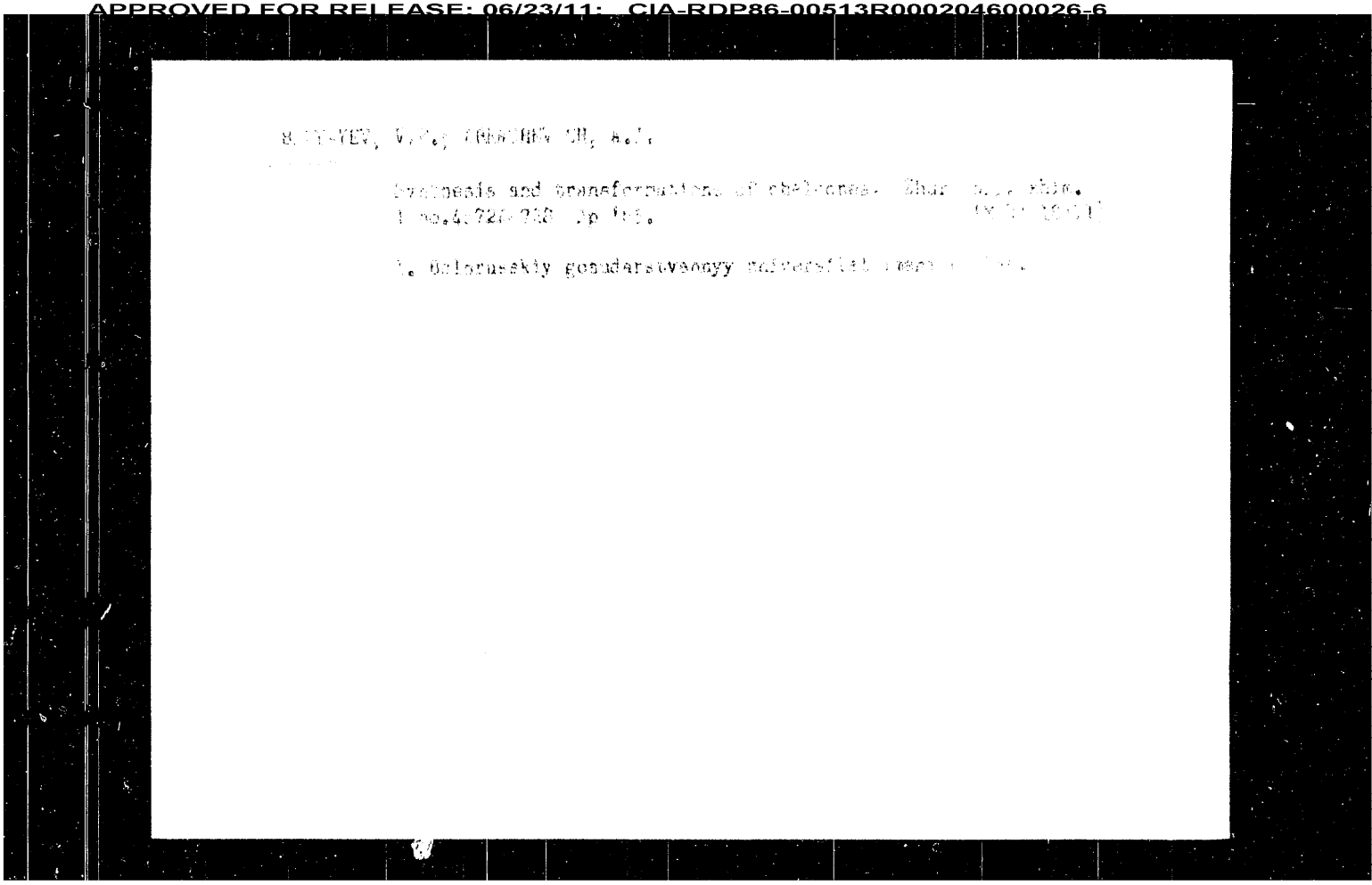
BELYAYEV, V.F.; KOVELEV, L.V.

Preparation of hydroperoxides of 1-isopropyl-1-cyclopentene and 1-propyl-1-cyclopentene. Uch.zap. BGU no.29:266-276 '56.
(Cyclopentene) (MIRA 11:11)

BELYAYEV, V.F.; SHAMANOVSKAYA, R.I.

Ketovinylation of 2-nitropropane. Zhur. org. khim. [illegible] 8:
1388-1390 Ag '55. (MLRA 18:11)

1. Belorusskiy gosudarstvennyy universitet imeni Lenina.



BELYAYEV, V.F., inzh.; PYASTOLOV, A.V., inzh.; SAVIN, V.Ye., tekhnik

Solutions on a basis of urea formaldehyde resin for strengthening loose ground. Shakht. stroi. 8 no.9:9-11 S '64.
(MIRA 17:12)

1. Ural'skiy nauchno-issledovatel'skiy i proyektnyy institut mednoy promyshlennosti.

BELYAYEV, V.F., gornyy inzh.; PYASTOLOV, A.V., gornyy inzh.; SAVIN, V.Ye., gornyy inzh.

Artificial means of strengthening water-saturated loose soil. Gor. zhur. no.9:28-29 S '64. (MIRA 17:12)

1. Ural'skiy nauchno-issledovatel'skiy i proyektnyy institut mednoy promyshlennosti, Sverdlovsk.

BELYAYEV, V.F., inzh.; SUMENKOV, N.S., inzh.; PYASTOLOV, A.V., inzh.; SAVIN, V. Ye., inzh.

Reinforcement of rocks to control deformations of the benches and slopes of strip mines. Shakht. stroi. 8 no.5:4-7 My'64 (MIRA 17:7)

1. Ural'skiy nauchno-issledovatel'skiy i proyektnyy institut mednoy promyshlennosti.

BELYAYEV, V.F., gornyy inzh.; PYASTOLOV, A.V., gornyy inzh.; SUMENKOV, M.S., gornyy inzh.; SAVIN, V.Ye., gornyy inzh.

Technical and economic estimation of the possibility of using artificial means of supporting rocks. Gor. zhur. no.9:26-27 S '62. (MIRA 15:9)

1. Ural'skiy nauchno-issledovatel'skiy i proyektnyy institut mednoy promyshlennosti, Sverdlovsk.
(Strip mining) (Mine timbering)

BELYAYEV, V.; BOCHAROV, V.; RUDAK, Ye.; UST'YANTSEV, A.

Potentialities for increasing labor productivity in the copper mines of the Urals. Biul. nauch. inform.: trud i zar. plata no.7:5-12 '59.
(MIRA 12:10)
(Ural Mountain region--Copper mines and mining)

Belyayev V.F.

BOCHAROV, V.I., gornyy inzh.; ANTONOV, B.V., gornyy inzh.; BELYAYEV, V.F., gornyy inzh.

Rapid mining in Ural copper mines. Gor. zhur. no.2:69-70 F '58. (MIRA 11:3)

1. Institut Unipromed'.
(Ural Mountains--Copper mines and mining)

Belyayev, V.D.

CHERNOV, M.I., redaktor; BELYAYEV, V.D., redaktor [deceased]; BUKHANOVSKIY, I.L., redaktor; ZHUDRO, A.K., redaktor; PETRUCHIK, V.A., redaktor; SEDOV, F.G., redaktor; SINITSYN, M.T., redaktor; SMIRNOV, Ye.V., redaktor; SOLOV'YEV, I.F., redaktor; SUBBOTIN, A.P., redaktor; CHERNOV, M.I., redaktor; DOBRONRAVOVA, S.M., redaktor, KRASNAYA, A.K., tekhnicheskiy redaktor.

[Dictionary of marine and river terms] Slovar' morskikh i rechnykh terminov. Moskva, Izd-vo "Rechnoi transport". Vol.1. A - M 1955. 215 p. (MLRA 9:4)
(Russian language--Dictionaries) (Navigation--Dictionaries)

DECEASED

BELYAYEV, Vladimir Dmitriyevich; GRIGOR'YEV, S.N., redaktor; VINOGRADOVA, N.M., redaktor; KRASNAYA, A.K., tekhnicheskiy redaktor.

[River explorations and the principles of hydrology; textbook for schools of the river fleet's headquarters command] Rechnye izyskaniia i osnovy gidrologii; Uchebnik dlia shkol komandnogo sostava rechnogo flota. Moskva, Gos. izd-vo vodnogo transporta, 1954. 174 p.
(Rivers) (Hydrology) (MLRA 7:12)

* see 2nd card

BELYAYEV, V.B., inzh.; VESELOV, Ya.A., inzh.

Prevention of increased vibration of bearings during the start of generators. Elek. sta 36 no.4:76 Ap '65. (MIRA 18:6)

BALASHOV, V.V.; BIELYAYEV, V.B.; ERAMZHYAN, R.A.

[Calculation of two-nucleon correlations in the theory of μ-capture by light nuclei] Uchet dvunukloonnykh korreliatsii v teorii μ-zakhvata legkimi iadrami. Dubna, Ob"edinennyi in-t iadernykh issledovanii, 1962. 11 p. (MIRA 15:2)
(Nuclear reactions) (Mesons)

BELYAYEV, V.B.; SARANTSEVA, V.R., tekhn. red.

[Possibility of the accumulation of optical neutrinos in closed cavities]O vozmozhnosti nakopleniia opticheskikh neitrino v zamknutykh polostiakh. Dubna, Ob"edinennyi in-t iadernykh issl., 1962. 5 p. (MIRA 15:10)

(Neutrinos)

Dipole excitations of nuclei ... S/056/62/042/005/035/050
B102/B138

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University)

SUBMITTED: December 23, 1961

Card 3/3

Dipole excitations of nuclei ...

energy shift of the dipole state with respect to the single-particle value are caused by nucleon correlations of dipole-dipole type. Long-range correlations of other multipolarity contribute to the dispersion of the dipole excitation. The increase in dipole excitation energy is proportional to the number of states in the last filled shell. In agreement with the shell model this effect is fundamental for heavy nuclei and unimportant for light ones. Pairing-type excitations have only a weak effect on the dipole excitation. It raises the energy of the dipole state only to the extent required for a destruction of the pairs. The contribution of pairing to the dispersion of the dipole excitation is of the order of c^2. The results indicate the direction of further development of the shell model of the giant resonance in deformed nuclei (S. G. Nilsson, B. R. Mottelson, Nucl. Phys., 13, 281, 1959). Allowance for pairing does not eliminate the main disadvantage of the model, the far too low value of giant resonance. This can be done by considering the non-diagonal dipole-dipole interaction between Nilsson-type single-particle states. Results of this will be published in later papers. N. P. Yudin is thanked for discussions. There are 2 figures and 1 table.

Card 2/3

S/056/62/042/005/035/050
B102/B138

AUTHORS: Balashov, V. V., Belyayev, V. B., Zakhar'yev, B. N.

TITLE: Dipole excitations of nuclei according to the superfluid model

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 5, 1962, 1365-1370

TEXT: The superfluid model has proved to be one of the best to explain nuclear peculiarities. Now it is used to investigate the possibilities of dipole excitations. The dipole state of a nucleus is considered as a superposition of a great number of two-quasiparticle excitations. The energy of this state is virtually unchanged by taking account of nucleon pairing in comparison with the values obtained in the single-particle model. These estimates (Wilkinson model) yield, however, far too low values of the giant resonance of photoabsorption. The dipole energy can be raised by introduction of dipole-dipole interaction, in addition to the pairing-type interaction. It is shown that the effects of collective intensification of dipole transitions and the presence of an

Card 1/3

BELYAYEV, V.B.; ZAKHAR'YEV, B.N.

Pair correlations and single-nucleon reduced level widths in nuclei. Izv. AN SSSR Ser.fiz. 25 no.9:1152-1155 '61.
(MIRA 14:8)

1. Laboratoriya teoreticheskoy fiziki Ob"yedinennogo instituta yadernykh issledovaniy.
(Nuclei, Atomic)

84226

The Energy Dependence of the Differential Cross Sections and the Mechanism of the (d,p) Reaction S/089/60/009/004/006/020 B006/B070

All reduced widths are given in the unit of 10^{-19} erg/cm. At the same time, some data are given for the $Be^{9}(d,p)Be^{10}$ reaction. The data given in the table are taken from Refs. 2, 9, 10, 11, 12, 13, 14, 15, and 17. The interpretation of the data in the table is briefly discussed. There are 1 table and 18 references: 3 Soviet, 6 British, 1 Japanese, and 8 US.

SUBMITTED: February 10, 1960

Card 3/3

The Energy Dependence of the Differential Cross Sections and the Mechanism of the (d,p) Reaction

the relative and absolute values of the reduced widths change with E_d.

Reaction	Level of the Final Nucleus [Mev]	Spin and Parity	Transition	Reduced Widths				
				E_d = 8	8.9	9	14.8	19 Mev
$C^{12}(d,p)C^{13}$	ground level	$1/2^-$	$p^8 \to p^9$	2.2	1.3	1.2	1.9	0.9
	3.09	$1/2^+$	$p^8 \to p^8 s_{1/2}$	3.0	3.8	6.5	8.3	1.6
	3.684	$3/2^-$	$p^8 \to p^9$	0.16	0.48	0.38	0.28	-
	3.855	$5/2^+$	$p^8 \to p^8 d_{5/2}$	3.5	2.6	1.4	5.7	1.1
				E_d=4.11	7.7	7.73	9	19.1Mev
$O^{16}(d,p)O^{17}$	ground level	$5/2^+$	$p^{12} \to p^{12} d_{5/2}$	0.66	1.0	2.5	3(rel.)	1.8
	0.875	$1/2^+$	$p^{12} \to p^{12} s_{1/2}$	1.1	2.6	7.0	9(rel.)	3.7
				E_d = 8	9	14.8	Mev	
$N^{14}(d,p)N^{15}$	ground level	$1/2^-$	$p^{10} \to p^{11}$	2.1	-	1.0		
	6.33	$3/2^-$	$p^{10} \to p^{11}$	-	0.23	0.18		
	8.32	$1/2^+$	$p^{10} \to p^{10}_{1/2}$	11.5	4.5	5.4		

Card 2/3

84226
S/089/60/009/004/006/020
B006/B070

24.6600

AUTHORS: Belyayev, V. B., Zakhar'yev, B. N., Neudachin, V. G.

TITLE: The Energy Dependence of the Differential Cross Sections and the Mechanism of the (d,p) Reaction

PERIODICAL: Atomnaya energiya, 1960, Vol. 9, No. 4, pp. 298 - 300

TEXT: The present "Letter to the Editor" gives the results of an analysis of the experimental data on stripping reactions. $d\sigma/d\Omega$ is represented as a function of the relative reduced level widths γ^2 in Born approximation, and the dependence of γ^2 on the deuteron energy E_d is described by Butler's formula. In order that the need for corrections to Butler's formula be as small as possible, only cases with $E_d > 4$ Mev have been selected for analysis. The results of the analysis are given in a table. The dependence of γ^2 on E_d is also given in the table. The absolute error of these data is 50%, and the relative error is 10%. In a number of cases,

Card 1/3

given by (1) in an isotopic-symmetric form. The relations, which are first derived in a general manner, are discussed in the approximation J = const and ϱ = const. It was found that (in the model under consideration) the residual np-, pp-, and nn interactions (after separation of the self-consistent field) produce a superfluid state of the nucleus. The ground-state energy of an even nucleus does not depend on the type of pairing (pp, nn, or pn) of the nucleons. The first excited state in light even-even (or odd-odd-with z = N) nuclei is separated from the ground state by an energy gap of the order 2ε. For the purpose of explaining the energy levels and the binding energies of the nuclei under consideration it is necessary to take into account the quadruple correlations of nucleons (α-particles) in addition to the pair correlations. The authors' assumption that np, pp, and nn pair correlations with equal quantum numbers s and m exist, which lead to the superfluid state of light nuclei was confirmed by data (Ref. 2) on the binding energy of the last neutron in light nuclei. Finally, the authors thank N. N. Bogolyubov for his highly interesting discussion. There are 4 references, 3 of which are Soviet.

82426
S/056/60/038/03/27/033
B006/B014

24.6520

AUTHORS: Belyayev, V. B., Zakhar'yev, B. N., Solov'yev, V. G.

TITLE: Superfluidity of Light Nuclei /9

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 3, pp. 952-954

TEXT: In the article under review, the authors made use of the physical ideas and mathematical methods of the theory of superconductivity to study the properties of light nuclei on the basis of the shell model. The nuclei of the range $22 \leq A \leq 32$ were selected as suited to the method. The residual interactions of protons and neutrons in the outer shell are studied. The most essential differences of these interactions in light nuclei as compared to heavy nuclei lies in the existence of neutron-proton interactions in addition to the pp- and nn interactions. The state of a nucleon is characterized by the quantum numbers s, m, and ϱ ($\varrho = \pm 1$ the sign of the projection (m) of the momentum onto the symmetry axis of the nucleus). The Hamiltonian of residual interactions between the nucleons within the range of Fermi surface energy $E_F - \delta \leq E(s,m) \leq E_F + \Delta$ is

Card 1/2

Mesic Molecular Processes in Hydrogen

7698J
SOV/56-37-6-21/55

The levels are given in electron volts; for mesic molecules with different nuclei the energy levels are calculated from the level of the heavier isotope. There are 3 tables; 1 graph; and 18 references, 9 Soviet, 5 U.K., 1 German, 1 Italian, 2 U.S. The 5 most recent U.S. and U.K. references are: L. W. Alvarez, H. Bradner, F. S. Crawford, Jr., J. A. Crawford, P. Falk-Vairant, M. L. Good, J. D. Low, A. H. Rosenfeld, F. Solmitz, M. L. Stevenson, H.K. Ticho, R. D. Tripp, Phys. Rev., 105, 1127, 1957; A. Ashmore, R. Nordhagen, K. Strauch, B. M. Townes, Proc. Phys. Soc., 71, 161, 1958; S. Cohen, D. L. Judd, R. J. Riddell, Phys. Rev., 110, 1471, 1958; M. Shimizu, Y. Mizuno, T. Izuyama, Progr. Theor. Phys., 20, 777, 1958; A. Belgerno, R. McCarroll, Proc. Roy. Soc., 237, 383, 1956.

ASSOCIATION: Joint Inst. Nuclear Research, USSR (Ob'yedinennyy institut yadernykh issledovaniy, SSSR)

SUBMITTED: June 7, 1959

Card 4/4

collision; $v_0 = \sqrt{2\Delta E/M_{12}}$; $a_\mu = \hbar^2/m_\mu e^2$. For the processes:

$p_\mu + d \longrightarrow d_\mu + p$, $p_\mu + t \longrightarrow t_\mu + p$, and $d_\mu + t \longrightarrow t_\mu + d$, the values of f were found to be, respectively: 2.11, 0.84, and 0.0067. In Table 3 are listed levels of the mesic molecules.

	$L=0$		$L=1$		$L=2$	$L=3$
	$n=0$	$n=1$	$n=0$	$n=1$	$n=0$	$n=0$
$(pp)_\mu$	252	—	109	—	—	—
$(dd)_\mu$	330	40	226	7?	88	—
$(tt)_\mu$	367	86	288	45	170	55
$(pd)_\mu$	220	—	90	—	—	—
$(pt)_\mu$	213	—	98	—	—	—
$(dt)_\mu$	319	32	2..	—	102	—

Table 3. Levels of mesic molecules.

Card 3/4

μ^- Mesic Molecular Processes in Hydrogen

76981
SOV/56-37-6-21/55

The magnitude of the correction was of the order of m_μ/M. The mesomolecular processes of μ^- -mesons with hydrogen are due to the neutrality of mesic atoms. This is owing to the fact that at distances greater than Bohr's orbits of mesoatoms (2.57×10^{-11} cm), the nuclear charge is practically fully shielded by the charge of the meson. Such a condition results in a peculiar catalysis of reactions in hydrogen (or its isotope mixtures), which was predicted by A. D. Sakharov (Report Phys. Inst. Acad. Sciences USSR, Moscow, 1948), and was experimentally investigated by A. Ashmore, R. Nordhagen, K. Strauch, and B. M. Townes (Proc. Phys. Soc., 71, 161, 1958). The effective cross section of the charge exchange (ch.e.) was determined in asymptotic form for $R \longrightarrow \infty$, and it could be represented as follows:

Card 2/4

$\sigma_{ch.e.} = 4\pi f a_\mu^2 v_o/v$, where v is velocity before

BELYAYEV, V.B.

24.6100, 24.6200, 16.8100, 16.7500

76981
SOV/56-37-6-21/55

AUTHORS: Belyaev, V. B., Gershteyn, S. S., Zakhar'ev, B. N., Lomnev, S. P.

TITLE: μ-Mesic Molecular Processes in Hydrogen

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 6, pp 1652-1662 (USSR)

ABSTRACT: A theoretical analysis was made of the mesic atomic and mesic molecular processes in a medium of hydrogen isotopes (the formation of mesic molecules, $H^{(1)}_{\mu} + H^{(2)} \longrightarrow (H^{(1)}\ H^{(2)})_{\mu}$; elastic collisions and charge exchange of mesic atoms, $H^{(1)}_{\mu} + H^{(2)} \longrightarrow H^{(1)}_{\mu} + H^{(2)}$, $H^{(1)}_{\mu} + H^{(2)} \longrightarrow H^{(1)} + H^{(2)}_{\mu}$). The calculations were performed on the BESM electronic machine with compensation for the motion of the nuclei.

Card 1/4

On the Depolarization of μ^--Mesons in Hydrogen, Deuterium, and Tritium SOV/56-35-4-28/52

There are 3 tables and 12 references, 8 of which are Soviet.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (United Institute for Nuclear Research)

SUBMITTED: May 19, 1958 (initially) and June 9, 1958 (after revision)

Card 3/3

table 2 shows the corresponding scattering cross sections, and table 3 contains the charge exchange possibilities. Numerical computations were carried out by S.Lomnev by means of an electronic computer. The results obtained by theoretical investigation show that in hydrogen and tritium the myons are completely depolarized before the mesic atom is slowed down to thermal energies. For the myon capture in the K-orbit of the mesic atom and for the case of the formation of mesic molecules the depolarization probabilities are determined. The motion of nuclei is taken into account by means of a corr ction $\sim \mu/M$. Also the differences in the hyperfine structure levels are approximately taken into account. In the course of the discussion, results are compared with those obtained by other authors. In conclusion ,the authors thank Ya.B.Zel'dovich, Academician, who supervised this work, S.S.Gershteyn for discussions, and Ya.A.Smorodinskiy and A.Ye.Ignatenko for their interest in this work; they also thank S.Lomnev for carrying out computations.

24(5)

AUTHORS: Belyayev, V. B., Zakhar'yev, B. N. SOV/56-35-4-33/52

TITLE: On the Depolarization of μ^--Mesons in Hydrogen, Deuterium, and Tritium (O depolyarizatsii μ^--mezonov v vodorode, deyterii i tritii)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 4, pp 996 - 1000 (USSR)

ABSTRACT: For the determination of the character interaction between negative myons and protons the investigation of the capture of the polarized μ^--meson is of considerable interest. However, this process becomes complicated because of the depolarization of the myon by the medium. In the present paper the authors investigate these conditions for hydrogen, deuterium, and tritium as well as the effects that depolarize μ^--mesons, by the method developed by Zel'dovich and Sakharov (Ref 2). The numerical calculation results are given in 3 tables. Table 1 contains the phases of the scattering of mesic atoms by nuclei for the states Σ_u and Σ_g for hydrogen, deuterium and tritium;

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On the Double β-Decay of Ca^{48}

56-2-32/51

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1. Calcium isotopes-β-Decay 2. Titanium isotopes-β-Decay

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On the Double β-Decay of Ca^{48}

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not take part in the process. Therefore only 8 nucleons are of interest here anyway. The radial functions of the mentioned nuclei are equal to each other and the corresponding integrals are not investigated here. The construction of the functions is made much easier by the simple structure of the nuclei selected. The functions for the initial state and for the final state were determined by L. A. Maksimov and Ya. A. Smorodinskiy (reference 4). The functions of the intermediary state are constructed analogously. Their spin-path-share corresponds to Yung's scheme [2111111] for T = 3 and [11111111] for T = 4. In the first case the intermediary function is reduced from the standpoint of spatial symmetry to a function of s = 2 nucleons. The formula found here for the half life is mentioned. If it is considered that the decay can also ass through excited intermediary states the value of about $1o^{19}$ years is obtained for its half life. A correction factor has still to be attached to the shell model calculated according to the decay probability. There are 5 references, 2 of which are Slavic.

ASSOCIATION: United Institute for Nuclear Research (Ob"yedinennyy institut yadernykh issledovaniy)

Card 2/3

AUTHORS: Belyayev, V. B., Zakhar'yev, B. N. 56-2-32/51

TITLE: On the Double β-Decay of Ca^{48} (O dvoynom β-raspade Ca^{48})

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958, Vol 34, Nr 2, pp 505-506 (USSR)

ABSTRACT: According to various experimental works (references 1, 2) the half life of double β-decay is greater than 10^{18} years. This made necessary a checking of the estimates for the probability of the β-decay with the emission of two neutrinos, mentioned in other works. M. Goeppert-Mayer (reference 3) estimated the probability of the two--neutrino decay but did not compute the nuclear matrix element which lead to a disagreement with the experiment. The authors deal with ju st this calculation in the approximation of the shell model. In this they investigate the case most suitable for these calculations, that is to say that of the decay Ca^{48} - Ti^{48}. Here it is made condition that the transition passes through a virtual intermediary state of Sc^{48}. All three nuclei of interest here (Ca^{48}, Sc^{48}, Ti^{48}) have the same core Ca^{40} which does

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Contribution by efficiency promoters and the improvement of the operation of "Andizhan"-type ships. Biul. tekh.-ekon. inform. Tekh. upr. Min. mor. flota 7 no.8:3-16 '62. (MIRA 16:5)

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(Railroads—Cost of operation)

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